

# Genital chlamydia trachomatis infection among female undergraduate students of University of Port Harcourt, Nigeria

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## ABSTRACT

**Background:** Genital Chlamydia trachomatis infection is a common bacterial sexually transmitted infection worldwide. There is little information about this infection in Nigeria. This study determined the prevalence of genital *Chlamydia trachomatis* infection among female undergraduates of University of Port Harcourt and identify the various associated risk factors. **Materials and Methods:** A cross-sectional prospective study of 354 female students was done. Their socio-demographic characteristics and pattern of sexual behaviour was noted followed by collection of endocervical swab which was analysed with a Chlamydia Rapid Test Device. Data management was done by SPSS version 17.0 statistical package. **Result:** The prevalence of genital *Chlamydia trachomatis* infection was 30.2%. First coital exposure at 14 years or less had the highest prevalence of the disease. Multiple sexual partners, tribe and inconsistent use of condom were significantly related with *Chlamydia trachomatis* infection. **Conclusion:** Genital *Chlamydia trachomatis* is prevalent among female undergraduates of the University of Port Harcourt.

**Key words:** Genital chlamydia infections, female undergraduates, Port Harcourt, Nigeria

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## INTRODUCTION

*Chlamydia trachomatis* infection is the most common bacterial sexually transmitted infection<sup>1,2</sup> and is generally considered as a silent infection.<sup>3,4</sup> Chlamydia is a small Gram-negative obligate intracellular bacterium that needs living host to multiply. They have a unique biphasic life cycle. The infectious metabolically inactive elementary body which infects the host, multiply and is transformed in the host to a metabolically active reticulate body.<sup>5</sup>

Genital *Chlamydia* infection is common among young sexually active people and most often asymptomatic with potential long-term consequences for female reproductive health.<sup>3,6</sup>

Silent untreated infection leads to dreaded consequences like pelvic inflammatory disease, infertility, ectopic

pregnancy and chronic pelvic pain.<sup>4,7,8</sup> It has been estimated that as much as 50% of salpingitis and infertility are caused by Chlamydia infection.<sup>8</sup>

Chlamydia has been identified as a cofactor in the transmission of HIV infection.<sup>9,10</sup> It has also been proposed as an independent risk factor for development of cancer of the cervix.<sup>11</sup>

The prevalence of *Chlamydia trachomatis* varies, it depends on the characteristics of the study population and the different methods used for Chlamydia detection.<sup>12</sup> The United States has an overall prevalence of 5%.<sup>13</sup> In the United Kingdom, recent data suggest that rate of infection among young women may exceed 10%.<sup>14</sup>

A systematic review by Vajdic *et al.*,<sup>15</sup> in Australia, reported an overall prevalence of 4.6%, with a higher prevalence of 5.6% among adolescent and young adults.

Prevalence of genital *Chlamydia trachomatis* in parts of Africa varies considerably ranging from 3.78% in Cameroon<sup>16</sup> to as high as 68.25% in female sex workers in Niger Republic.<sup>17</sup> Data from African countries suggest that prevalence is on the rise and may exceed that reported in developed countries.<sup>9,17,18</sup>

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Reports from Nigeria vary as well; Mawak *et al.*,<sup>19</sup> reported a prevalence of 56.1% among 164 women attending gynaecology clinic in Jos Plateau. A prevalence of 51% was reported by Okoror *et al.*,<sup>20</sup> among pregnant and non-pregnant women and their spouses attending prenatal and antenatal clinic of College of Medicine of University of Lagos. Nwanguma *et al.*,<sup>9</sup> in Owerri and Nsukka studied 102 Nigerians, comprising 69 volunteers of unknown HIV status, 17 HIV-seropositive subjects and 16 HIV-seronegative subjects. A prevalence of 50% in HIV-positive volunteers and 17% in the HIV-negative group was reported, with an overall prevalence of 33% reported in the asymptomatic volunteers.<sup>9</sup>

This study was aimed to determine the prevalence of genital Chlamydia among female undergraduate in Port Harcourt and to determine and explore the various risk factor responsible for the disease.

## MATERIALS AND METHODS

Approval for the study was given by the Institutional Research and Ethical Committee.

Participants were female undergraduates of University of Port Harcourt aged 15-30 years.

The students were randomly selected by simple balloting.

A structured questionnaire was administered to those who gave their consent to enquire about their socio-demographic characteristic, age at first sexual exposure,

sexual behaviour, use of barrier contraception and other risk factors for Chlamydia infection.

A sterile speculum was passed to visualise the cervix and endocervical swab was collected with a sterile plastic-shaft Dacron swab. The swab was processed to extract Chlamydia antigen and analysed using Chlamydia rapid test device (swab/urine). The Chlamydia rapid test device is a qualitative lateral flow immunoassay for the detection of Chlamydia antigen from female cervical swab, male urethral swab and male urine manufactured by Inter-Chemical Ltd Shenzhen China.<sup>21</sup> In this test antibody specific to the Chlamydia antigen was coated on the test line region of the test kit. The test procedure was conducted according to the manufacturer's instruction manual.<sup>21</sup>

Data were analysed using the statistical package for social science (SPSS) version 17. The data were presented as means, rates and proportion in tables. Correlations between various variables were done. Statistical test of association was carried out where applicable and the level of significance set at  $P < 0.05$ .

## RESULTS

Three hundred and fifty-four participants were enrolled into this study. One hundred and seven (30.2%) of them tested positive for Chlamydia infection, while 24 (6.8%) of the test were invalid, the rest 223 (63.0%) of the participant tested negative.

Table 1 shows the biodata of the participants, the frequencies, the percentages and the prevalence of

**Table 1: Biodata of participants**

Variables	Total/%	Positive/%	Negative/%	Invalid/%	P-Value
Age (years)					
15-19	136 (38.4)	39 (28.7)	91 (66.9)	6 (4.4)	0.179
20-25	186 (52.5)	54 (29.0)	115 (61.8)	17 (9.1)	
26-30	32 (9.0)	14 (43.8)	17 (53.1)	1 (3.1)	
30-35	0 (0)	0 (0)	0 (0)	0 (0)	
Marital status					
Single	323 (91.2)	100 (31.0)	203 (63.8)	20 (6.2)	0.280
Married	31 (8.8)	7 (22.6)	20 (64.5)	4 (12.9)	
Divorced					
Religion					
Christian	332 (93.8)	106 (31.9)	206 (62.0)	20 (6.0)	0.06
Islam	22 (6.2)	1 (4.5)	17 (77.3)	4 (18.2)	
Others					
Tribe					
Ibo	157 (44.6)	38 (24.2)	111 (70.7)	8 (5.1)	0.000
Hausa	15 (4.2)	2 (13.3)	10 (66.7)	3 (20.0)	
Yoruba	33 (9.3)	5 (15.2)	23 (69.6)	5 (15.2)	
Ijaw	59 (16.7)	21 (35.6)	36 (61.0)	2 (3.4)	
Ibibio	27 (5.6)	16 (59.3)	10 (37.0)	1 (3.7)	
Ikwere	39 (11.0)	13 (33.3)	24 (61.5)	2 (5.1)	
Others	24 (6.8)	12 (50.0)	9 (37.5)	3 (12.5)	

genital *Chlamydia trachomatis* in relation to these variables. The age range of the participant was 15-30 years. The mean age of the participant was 20.946 ± 3.335.

The prevalence of genital *Chlamydia trachomatis* infection was higher in the age range of 26-30 years with a prevalence of 43.8%.

Three hundred and twenty-three (91.2%) students were single while 31(8.8%) were married. Of the 323 singles, 100 (31.0%) tested positive to *Chlamydia trachomatis* infection while 7 (22.6%) of the 31 married students also tested positive. *P* value = 0.208.

Majority 332 (93.8%) were Christians, while Muslim's were 22 (6.2%) [Table1]. One hundred and six of the Christians tested positive giving a prevalence of 31.9%, while only 1 of the 22 Muslims was positive with a prevalence of 4.5% (*P*-value = 0.06).

Ethnicity had a significant relation with genital *Chlamydia trachomatis* infection [Table 1]. The Ibo's were the majority comprising 157 (44.6%) of the participants, while the Hausa's 15 (4.2%). The infection was more prevalent among the Ibibios, 16 of the 27 participants were positive with a prevalence of 59. 3% *P* = 0.00.

Table 2 shows the sexual characteristic of the participants, the frequencies and the various relationship with chlamydia infection.

The mean age at coitarche among the participants was 16.39 ± 2.32. Two hundred and twenty-five (72.0%) of the students had their first coital exposure between the ages of 15 and 19years. Seventy of the students had their first coital exposure at 14 years of age or less, amongst these students 45 (64.3%) of them were positive for chlamydia infection. Age at first coital expure was significantly related to chlamydia infection in this study *P* = 0.00

More of the participants had 1-2 sexual partners and life-time sexual partners. Thirty-six students (10.2%) had 5 or more life time sexual partners, out of which 30 tested positive for *Chlamydia trachomatis* infetion with a prevalence of 83.3%. Number of sexual partners was also significant *P* = 0.00.

## DISCUSSION

The prevalence of genital *Chlamydia trachomatis* infection in this study was 30.2%. This is similar to a prevalence of 29.4% reported by Ikeme *et al.*, in Enugu<sup>22</sup> and 33% reported in asymptomatic volunteers by Nwanguma *et al.*<sup>9</sup> The result from this study is at variance with higher values reported by other researchers, Mawak *et al.*, reported prevalence of 56.1% in Jos Plateau,<sup>19</sup> while Okoror *et al.*, reported a prevalence of 51% among pregnant women attending antenatal clinic in Lagos state.<sup>20</sup> The prevalence of Chlamydia infection has been known to vary depending on the population studied and laboratory method of analysis used.<sup>12</sup>

The prevalence of Chlamydia infection in this study and others found in different parts of Nigeria is high when compared to those in developed countries. In Europe, the prevalence ranged from 1.7 to 17% depending on the setting, context and country,<sup>23</sup> while the USA has an overall prevalence of 5%.<sup>13</sup> These marked difference could be as a result of organised screening for Chlamydia infection that exist in developed countries, increased awareness of *Chlamydia trachomatis* infection, easy access to laboratory diagnosis and treatment, the reverse of which is the case in developing countries like Nigeria.

The risk factors for the transmission of *Chlamydia trachomatis* infection includes history of co-existing or previous sexual transmitted infection, early age at coitarche, multiple sexual partners, non-use of barrier contraception, HIV seropositivity, being unmarried, black race and involvement with new partners.<sup>4,9,10,19,24,25</sup> Age less than 25 has continued to be an important risk factor for *Chlamydia*

**Table 2: Sexual behaviour of participants**

Variables	Total/%	Positive/%	Negative/%	Invalid/%	<i>P</i> -Value
Age at coitarche					
≤14	70 (19.2)	45 (64.3)	21 (30.0)	4 (5.7)	0.000
15-19	255 (72.0)	58 (22.7)	177 (69.4)	20 (7.8)	
20-25	28 (7.9)	4 (14.3)	24 (85.7)	0 (0)	
>25	1 (0.3)	0 (0)	1 (100)	0 (0)	
No of life time sexual partners					
1-2	208 (58.7)	19 (9.1)	173 (83.2)	16 (7.7)	0.000
3-4	110 (31.1)	58 (52.7)	44 (40.0)	8 (7.3)	
≥5	36 (10.2)	30 (83.3)	6 (16.7)	0 (0)	
Use of condom					
Always	35 (9.9)	0 (0)	35 (100)	0 (0)	0.000
Occasional	310 (87.6)	101 (32.6)	185 (59.7)	24 (7.7)	
Never	9 (2.5)	6 (66.7)	3 (33.3)	0 (0)	

*trachomatis* infection.<sup>4,25</sup> The finding from this study differed from this fact. The highest prevalence of genital *Chlamydia trachomatis* in this study was among age group of 26-30 years with a prevalence of 43.8%. This is similar to the findings of Mawak *et al.*,<sup>19</sup> who noted the highest prevalence in age group 25-29 years. This age group fall within sexually active adolescents and young adult in whom the disease is commoner and this could be the reason for the higher prevalence of the infection in this age group.<sup>17</sup> The infection was more in singles (31.0%) than married students (22.6%). This differed from other studies that noted the infection to be more in married than single ladies.<sup>19</sup> This is not unexpected because of the population studied.

Ethnicity was found to be statistically significant in this study with the highest prevalence (59.3%) of the infection occurring in the Ibibio's. This may be related to their majority in this environment so the results may be skewed in their favour. The sexual characteristics assessed in this study were statistically significant with *Chlamydia trachomatis* infection. Early coitarche was associated with Chlamydia infection. This study is similar to other studies that have linked Chlamydia trachomatis infection with early coitarche.<sup>10,19,26</sup>

Multiple sexual partners was also significantly associated with, of the 110 participant with 3-4 sexual partners, 58 (52.7%) tested positive while 30 (83.8%) of 36 with 5 or more sexual partners tested positive. This is in keeping with results of other studies that have identified number of sexual partners to be significantly related to Chlamydia infection.<sup>10,19,24-26</sup>

This study is in agreement with several other studies which has found that inconsistent use of condom has been associated with chlamydia trachomatis infection.<sup>10,24-26</sup>

In conclusion, Chlamydia trachomatis infection is prevalent amongst female undergraduates of University of Port Harcourt.

Early coitarche, multiple number of sexual partners and inconsistent use of condoms are significantly related to genital Chlamydia trachomatis. Recommendation since Chlamydia trachomatis infection is prevalent amongst these students and is mainly silent with no available vaccine against it, there should be community health education on the need to avoid risky sexual practices by inclusion of sex and health education in the school curriculum at the secondary level. Health talks and programs should be organised by the health units at the tertiary level also there is the need to involve the religious organizations as well as the various youth organisations and groups. There is also the need for the government to develop and implement Chlamydia control strategies by putting in place a screening programmes that will identify those at risk, those infected and treat the infected person so as to safeguard their future reproductive health.

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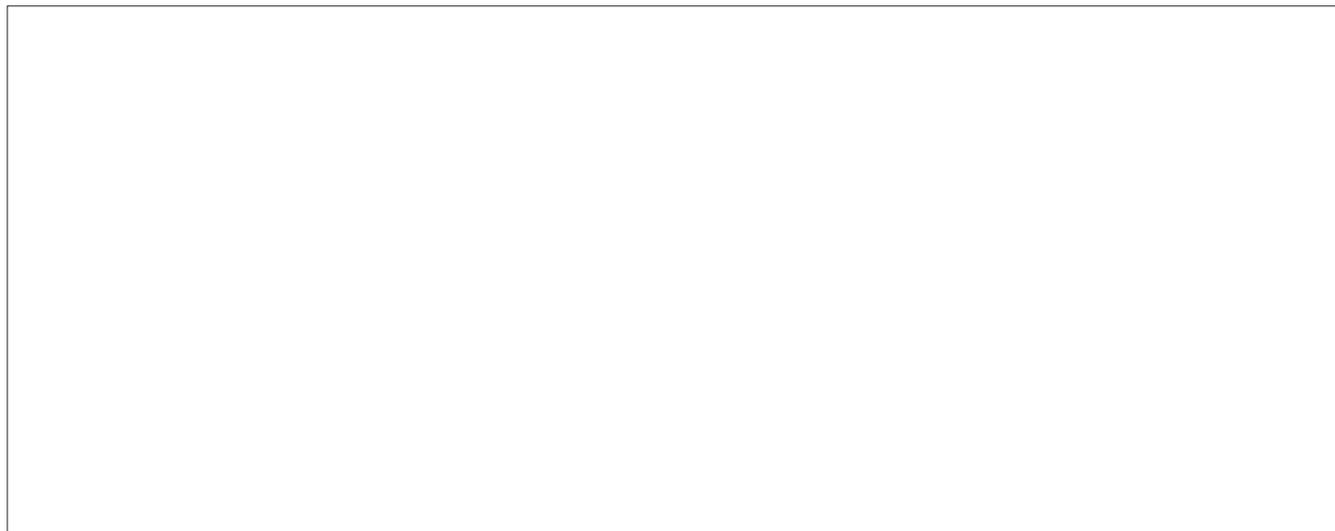
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